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$$=\frac{\sqrt{6}+\sqrt{3}+\sqrt{2}+2}{5+2\sqrt{6}},\ =\frac{(\sqrt{6}+\sqrt{3}+\sqrt{2}+2)(5-2\sqrt{6})}{25-24},$$

$$=\sqrt{6}-\sqrt{2}+\sqrt{3}-2.$$

Also solved by *COOPER D. SCHMITT* and the *PROPOSER*.

73. Proposed by G. B. M. ZERR, A. M., Ph. D., President and Professor of Mathematics, Russell College, Lebanon, Va.

Find the worth of each of five persons, A, B, C, D, and E, knowing, 1st, that when A's worth is added to a times what B, C, D, and E are worth, it is equal to m; 2nd, when B's worth is added to b times what A, C, D, and E are worth, it is equal to n; 3rd, when C's worth is added to c times what A, B, D, and E are worth, it is equal to p; 4th, when D's worth is added to d times what A, B, C, and E are worth, it is equal to q; 5th, when E's worth is added to e times what A, B, C, and D are worth, it is equal to r.

I. Solution by the PROPOSER.

Let x, y, z, u, v be the worth of A, B, C, D, and E, respectively. Then

$$\begin{aligned}
&x+a(y+z+u+v)=m,\\
&y+b(x+z+u+v)=n,\\
&z+c(x+y+u+v)=p,\\
&u+d(x+y+z+v)=q,\\
&v+e(x+y+z+u)=r.
\end{aligned}$$

Let $x+y+z+u+v=s$; then $x+a(s-x)=m$.

$\therefore\ x=(m-as)/(1-a)$..........(1). Similarly, $y=(n-bs)/(1-b)$........(2),

$z=(p-cs)/(1-c)$................(3), $u=(q-ds)/(1-d)$................(4),

$v=(r-es)/(1-e)$................(5).

Adding (1), (2), (3), (4), and (5), we get

$$s=\frac{m-as}{1-a}+\frac{n-bs}{1-b}+\frac{p-cs}{1-c}+\frac{q-ds}{1-d}+\frac{r-es}{1-e}.$$

$$\therefore\ s=\frac{\left\{\dfrac{m}{1-a}+\dfrac{n}{1-b}+\dfrac{p}{1-c}+\dfrac{q}{1-d}+\dfrac{r}{1-e}\right\}}{\left\{1+\dfrac{a}{1-a}+\dfrac{b}{1-b}+\dfrac{c}{1-c}+\dfrac{d}{1-d}+\dfrac{e}{1-e}\right\}}.$$

This value of s in (1), (2), (3), (4), (5) gives x, y, z, u, v.

II. Solution by COOPER D. SCHMITT, M. A., Professor of Mathematics, University of Tennessee, Knoxville, Tenn.; and Professor CHAS. C. CROSS, Laytonsville, Md.

By the conditions we have at once the five equations; letting x, y, z, u, t, $=A$, B, C, D, E, and F's shares, respectively :

$$\begin{aligned}&x+ay+az+au+at=m,\\&bx+y+by+bu+bt=n,\\&cx+cy+z+cu+ct=p,\\&dx+dy+dz+u+dt=q,\\&ex+ev+ez+eu+t=r.\end{aligned}$$

Hence by Determinants,

$$x=\begin{vmatrix} m & a & a & a & a \\ n & 1 & b & b & b \\ p & c & 1 & c & c \\ q & d & d & 1 & d \\ r & e & e & e & 1 \end{vmatrix} \div \begin{vmatrix} 1 & a & a & a & a \\ b & 1 & b & b & b \\ c & c & 1 & c & c \\ d & d & d & 1 & d \\ e & e & e & e & 1 \end{vmatrix},$$

$$y=\begin{vmatrix} 1 & m & a & a & a \\ b & n & b & b & b \\ c & p & 1 & c & c \\ d & q & d & 1 & d \\ e & r & e & e & 1 \end{vmatrix} \div \begin{vmatrix} 1 & a & a & a & a \\ b & 1 & b & b & b \\ c & c & 1 & c & c \\ d & d & d & 1 & d \\ e & e & e & e & 1 \end{vmatrix},$$

and so with z, u, and t, each determinant possessing 120 terms, when expanded.

GEOMETRY.

Conducted by B. F. FINKEL, Springfield, Mo. All contributions to this department should be sent to him.

SOLUTIONS OF PROBLEMS.

76. Proposed by L. B. FRAKER, Bowling Green, Ohio.

Lines run from a point, P, within a triangular piece of land to the angles A, B, and C are 91, 102, and 80 rods, respectively; and a line 78 rods in length passing through the point, P, and terminating in the sides AC and BC cuts off 3024 square rods adjacent to angle C. Required the dimensions of the land.